

## Workshops for in-door mobile robots using Robot Operating System (ROS)

### Introduction

Robots are taking over more and more tasks from human. At home, it is common to have robot cleaner automatically vacuum the rooms.

These robots come with basic Artificial Intelligence to create the map of the home layout and navigate autonomously. New generation of robot helpers will be able to recognize family members, respond to voice commands, etc.

With the open source ROS (Robot Operating System), it is possible to build and develop such home mobile robots without developing the software from scratch.

These workshops will help students and makers to get started to develop their own AI mobile robots for home.

Students who have completed these workshops can participate in **RoboCup@Home** international competition.

### Workshops

	Module title & Description	Duration (hr)	Remark
1)	<b>Introduction to in-door mobile robots</b> This workshop gives examples, key requirement of in-door mobile robots. It covers the various system components of the robot, an introduction of <b>ROS</b> followed by demonstration of driving the robot, performing <b>SLAM</b> (Simultaneous Localization and Mapping) and autonomous navigation. There will be an introduction to RoboCup@Home competition.	2	
2)	Introduction to ROS Topics covered will be: What is ROS? Ubuntu OS version and installation. TurtleBot platforms and other mobile platforms. Useful Linux commands. Creating ROS package. Simple publisher and listener.	4	Raspberry Pi will be used for hands-on.
3	SLAM Base control, LIDAR, RVIZ, ROS topics for Navigation. SLAM with manual mapping, launch files for SLAM, Map editing.	4	RPLIDAR, AI robot car will be used for hands-on
4	Navigation AMCL method, theory of navigation, navigation parameters, launch files for navigation. Single goal and multi-point navigation.	3	
5	Vision capture and voice synthesis Speaking robot, enabling sound, enabling camera, voice synthesis and video streaming.	2	

### Who Should Attend

- Students or makers who are interested in AI mobile robot.
- Suitable for age 15 and above.

### Prerequisite

- Has basic python programming knowledge and experience.
- 

### Course Methodology

This workshop is best done in the classroom. Online version is possible if the students loan the robot and practice at home.